

Chandrayaan 3 Mission, Background, Objection & Features

Chandrayaan-3 Mission is a planned third lunar exploration by the ISRO.

Chandrayaan 3 Mission

India's third moon mission, Chandrayaan-3, is a continuation of Chandrayaan-2, which was launched in July 2019 and has as its goal to place a rover on the lunar South Pole.

The Satish Dhawan Space Centre in Sriharikota will launch the mission on July 14, 2023, using a Launch Vehicle Mark 3 (LVM3).

Chandrayaan 3 Mission Background

- The third lunar exploration mission, as planned by the Indian Space Research Organisation (ISRO), will use the Chandrayaan 3 spacecraft.
- This spacecraft was designed by ISRO to showcase India's expertise in soft landings on stellar bodies.
- Only a rover and lander will be present, and it will only connect with the earth through an orbiter from Chandrayaan 2.
- This expansive purpose includes integration, cognition, and a number of permutations.
- The orbiter, rover, and lander were all included in the design of the Chandrayaan 2 spacecraft by ISRO.
- This spacecraft was launched using the GSLV-Mk 3, one of the most powerful geosynchronous launchers.
- The rover Pragyaan's attempt to travel on the Moon was hampered by the lander Vikram's failure to make a smooth landing. In order to demonstrate India's landing skills needed for the Lunar Polar Exploration Mission, another mission was attempted as a result. In 2024, this Moon South Pole mission will be carried out in cooperation with Japan. India will contribute a lander, and Japan will contribute a rover and rocket.

Chandrayaan 3 Details

Four throttle-able engines will power the lander of ISRO's Chandrayaan 3 mission.

- A Laser Doppler Velocimeter (LDV) will also be added to it. Up to a 100 km lunar orbit, the propulsion module will support the lander and rover combination.
- The Spectro-polarimetry of Habitable Planet Earth (SHAPE) payload aboard the propulsion module allows researchers to examine spectral and Polarimetric observations of Earth from the lunar orbit.

Lander payloads: Langmuir Probe (LP) to calculate the plasma density and its changes; Chandra's Surface Thermophysical Experiment (ChaSTE) to measure thermal conductivity and temperature; Instrument for Lunar Seismic Activity (ILSA) to measure seismicity around the landing site. For lunar laser ranging research, a NASA passive Laser Retroreflector Array is available.

Rover payloads: Alpha Particle X-ray Spectrometer (APXS) and Laser Induced Breakdown Spectroscope (LIBS) for deriving the elemental composition in the vicinity of landing site.

Chandra Surface Thermophysical Experiment (ChaSTE): While the Instrument for Lunar Seismic Activity (ILSA) measures the seismicity at the landing site, it will measure thermal conductivity and temperature.

Chandrayaan 3 Mission Objective

Chandrayaan 2 mission is to explore the far side of the Moon. The primary objective will be to demonstrate soft landing capability on the Moon.

Chandrayaan 3 Budget

With a ₹615 million budget, India's Chandrayaan-3 project seeks to deploy a rover and place a lander on the moon's surface. It will research the moon's characteristics, seismicity, plasma environment, and composition after launching.

Chandrayaan 3 Spacecraft

- With a rover and lander, Chandrayaan 3 will launch into space. No orbiter like Chandrayaan 2 will be present.

- In particular, regions of the Moon's surface that haven't seen sunlight in a few billion years are being examined by India.
- Scientists and astronomers believe that these darker regions of the lunar surface may contain ice and rich mineral deposits.
- Additionally, this exploration will not only focus on the surface but also attempt to investigate the exosphere and subsurface.
- An orbiter from Chandrayaan 2 will be used by the rover of this spacecraft to connect with Earth.
- At a distance of 100 km from the lunar orbit, it will take photographs to examine the surface.

Chandrayaan 3 Mission: Reason to Target Moon's South Pole

- Chandrayaan 3 will primarily target the Moon's southern pole because it has more shadowed space than the northern pole.
- These regions of the lunar surface may have a constant supply of water, according to scientists.
- Additionally, the craters found at the southern pole are of great interest to scientists.
- They think the cryptic fossil records of the early planetary system may be present in these cold traps.

Chandrayaan 3 Mission: A Tribute to Chandrayaan-2

- The names Vikram and Pragyan will be carried over to the Chandrayaan-3 mission, according to ISRO Chairman.
- This choice honours the 2019 Chandrayaan-2 lunar mission and highlights India's dedication to its space exploration tradition.

Chandrayaan 3 Improved upon Chandrayaan-2

Simplified payload

Chandrayaan-3 will just have a lander and a rover, as opposed to Chandrayaan-2, which also had an orbiter, the Pragyan rover, and the Vikram lander. During the mission, the orbiter that was launched with Chandrayaan-2 will be used for communication and terrain mapping needs. Chandrayaan-3's propulsion module will house a single instrument called 'spectro-polarimetry of habitable planet earth' (SHAPE), as

opposed to Chandrayaan-2's orbiter, which carried nine in-situ instruments.

Enhanced Lander capabilities

'Lander danger identification & avoidance cameras' are a feature of Chandrayaan-3 that let mission control, the orbiter, and the lander communicate when the lander is descending to the lunar surface. Compared to its predecessor's single camera, Chandrayaan-3 will have two of these cameras.

Chandrayaan 3 Mission: Overcoming Past Challenges

When a failed attempt at a soft landing resulted in the loss of the lander-rover combo and the payloads, the Chandrayaan-2 programme suffered setbacks. Unfazed by the failure of the first mission, ISRO revealed its intentions for Chandrayaan-3, which aims for a successful lunar landing.